UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/896,703	06/29/2001	Sumit A. Talwalkar	CM03093J	9139

7590 05/10/2005

Frank M. Scutch, III
Motorola, Inc.
Law Department
8000 West Sunrise Boulevard
Fort Lauderdale, FL 33322

EXAMINER	
MEEK, JACOB M	
ART UNIT	**PAPER NUMBER**
2637	

DATE MAILED: 05/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/896,703	Applicant(s) TALWALKAR ET AL.	
	Examiner Jacob Meek	Art Unit 2637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 January 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 6, 8 - 16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 6, 8 - 16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed January 18, 2005 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 1 – 5 and 12 - 16 have been considered but are moot in view of the new ground(s) of rejection.

3. Applicant's arguments filed 1/18/05 have been fully considered but they are not persuasive.

With regard to applicant's argument regarding the filtering of signals. Examiner notes that claim limitation states "incoming digital signal" of which Wannasarnmaytha describes a system for use with a QPSK signal, which is a digitally modulated signal and when given its broadest interpretation applies to the incoming signal. Therefore the filters of Wannasarnmaytha are filtering a digitally modulated signal. Examiner further notes that functionality of filters used by Wannasarnmaytha provide analogous functionality to that of applicant's filters.

With regard to applicant's argument regarding time and frame observation capabilities in Wannasarnmaytha examiner notes that Wannasarnmaytha states that the preamble is delayed and held while offset is estimated (see page 248, 2nd column, last paragraph). (Examiner further notes that Wannasarnmaytha is specific regarding the time versus frequency relationship of his system (see page 248, 2nd column, last paragraph)). Frequency offset and time offsets in this type of system are closely related.

With regard to applicant's argument regarding the arrangement of the system. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., one step)

are not recited in the rejected claim(s). Also, examiner notes that the reference must be considered as a whole. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Claims 1 - 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Wannasammaytha et al (Two-step Kalman-filter-based AFC for direct conversion-type receiver in LEO satellite communications; Wannasarnmaytha, et al; Vehicular Technology, IEEE Transactions on , Volume: 49 , Issue: 1 , Jan. 2000 , Pages:246 – 253).

With regard to Claim 1, Wannasarnmaytha teaches a digital receiver consisting of a first channel select (CS) filter filtering an incoming digital signal (see Figure 2, LPF); a frame synchronization detector for recognizing a time synchronization word from the first filtered signal; a coarse symbol time estimator for coarsely adjusting the time synchronization of the digital signal from the frame synchronization detector (see Figure 2, Kalman filter in Coarse Kalman filter-based AFC, where examiner interprets Kalman filters to provide time estimation and frame observation capabilities); a fine frequency estimator for finely adjusting the frequency of the signal from the coarse symbol time estimator for providing a frequency adjusted signal (see Figure 2, S/H and NCO for frequency adjustment components); a mixer for combining the incoming digital signal with the frequency adjusted signal and providing a time and frequency compensated digital signal (see Figure 2, mixer block in Coarse Kalman-Filter block and page 248, right column, last paragraph); a second CS filter for filtering the frequency compensated digital signal (see Figure 2, Root Nyquist filter); a fine symbol time estimator for determining symbol timing with greater precision (see Figure 2, Fine Kalman-Filter block); and a symbol detector for interpreting the incoming digital signal (see Figure 2, decision block and output data).

Wannasarnmaytha is silent on the specific details regarding single synchronization word noted in preamble of the claim. However, Wannasarnmaytha discusses large frequency offsets that are present in the satellite system disclosed (+/- 40 kHz, Section V, 1st paragraph). Therefore it would be

possible with smaller frequency offsets for acquisition times to be faster for disclosed system. Also, synch words are assumed to be present as a standard matter of data transmission protocol.

With regard to Claim 2, Wannasarnmaytha teaches the limitations of claim 1 with the addition of a digital receiver wherein the first CS filter has a wider bandwidth than second CS filter. Wannasarnmaytha states that the Root Nyquist filter of Figure 2 performs a pulse shaping function (page 249, left column, 1st full paragraph) which examiner interprets as further limiting the bandwidth of the received signal.

With regard to Claim 3, Wannasarnmaytha teaches the limitations of claim 1 with the addition of a digital receiver wherein the 2nd IF (CS?) filter has less bandwidth than the 1st CS filter. Wannasarnmaytha states that the Root Nyquist filter of Figure 2 performs a pulse shaping function (page 249, left column, 1st full paragraph) which examiner interprets as further limiting the bandwidth of the received signal. The selection of the filter ratios would be a design choice based on the operating parameters of the system.

With regard to claim 4, Wannasarnmaytha teaches the limitations of claim 1. Wannasarnmaytha fails to teach the first CS filter has a 3 decibel (dB) bandwidth of approximately 6 Kilohertz (KHz). Wannasarnmaytha teaches the first CS filter has a bandwidth of approximately 32 (16, 8) Kilohertz (KHz)(see Table 1). Selection of the 1st filter bandwidth would be a design choice based on the operating parameters of the system.

With regard to claim 5, Wannasarnmaytha teaches the limitations of claim 4. Wannasarnmaytha fails to teach the 2nd CS filter has a 3 decibel (dB) bandwidth of approximately 3 Kilohertz (KHz). Wannasarnmaytha teaches the 2nd CS filter has performs pulse shaping on the output of the coarse acquisition phase which examiner interprets as further limiting the bandwidth of received signal. Selection of the 2nd filter bandwidth would be a design choice based on the operating parameters of the system.

With regard to Claim 6, Wannasarnmaytha teaches fast frequency and time acquisition system consisting of a first channel select filter for filtering digital baseband information (see Figure 2, LPF); a frame synchronization detector for detecting a synchronization word in the digital baseband information

from the first CS filter; a coarse symbol time estimator coarsely determining the symbol time of the digital signal from the frame synchronization detector (see Figure 2, Kalman filter in Coarse Kalman filter-based AFC, where examiner interprets Kalman filters to provide time estimation and frame observation capabilities); a fine frequency estimator for finely determining the frequency error of the signal from the coarse symbol time estimator providing frequency adjustment (see Figure 2, S/H and NCO for frequency adjustment components); a mixer for combining the unfiltered digital information with the frequency error estimate to provide a mixed frequency corrected digital signal (see Figure 2, mixer block in Coarse Kalman-Filter block and page 248, right column, last paragraph); a second CS filter for filtering the mixed digital signal (see Figure 2, Root Nyquist filter); a fine symbol time estimator for finely determining the symbol time of the signal from the second CS filter (see Figure 2, Fine Kalman-Filter block); and a symbol detector for decoding the digital signal from the fine symbol time estimator (see Figure 2, decision block and output data).

With regard to Claim 8, Wannasarnmaytha teaches the limitations of claim 6 with the addition of a digital receiver wherein the first CS filter has a wider bandwidth than second CS filter. Wannasarnmaytha states that the Root Nyquist filter of Figure 2 (page 249, left column, 1st full paragraph) performs a pulse shaping function which examiner interprets as further limiting the bandwidth of the received signal.

With regard to Claim 9, Wannasarnmaytha teaches the limitations of claim 6 with the addition of a digital receiver wherein the 2nd CS filter has less bandwidth than the 1st CS filter. Wannasarnmaytha states that the Root Nyquist filter of Figure 2 (page 249, left column, 1st full paragraph) performs a pulse shaping function which examiner interprets as further limiting the bandwidth of the received signal. The selection of the filter ratios would be a design choice based on the operating parameters of the system.

With regard to claim 10, Wannasarnmaytha teaches the limitations of claim 6. Wannasarnmaytha fails to teach the first CS filter has a 3 decibel (dB) bandwidth of approximately 6 Kilohertz (KHz). Wannasarnmaytha teaches the first CS filter has a bandwidth of approximately 32 (16, 8) Kilohertz

(KHz) (see Table 1). Selection of the 1st filter bandwidth would be a design choice based on the operating parameters of the system.

With regard to claim 11, Wannasarnmaytha teaches the limitations of claim 10. Wannasarnmaytha fails to teach the 2nd CS filter has a 3 decibel (dB) bandwidth of approximately 3 Kilohertz (KHz). Wannasarnmaytha teaches the 2nd CS filter has performs pulse shaping on the output of the coarse acquisition phase which examiner interprets as further limiting the bandwidth of received signal. Selection of the 2nd filter bandwidth would be a design choice based on the operating parameters of the system.

As to claims 12 – 16, the steps claimed as method are a restating of the function of the apparatus of the specific components of the apparatus as claimed above and therefore it would have been obvious considering the aforementioned rejection for the apparatus claims 1 – 5.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1 - 3, and 12 - 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moher et al (US-6,693,983).

With regard to Claim 1, Moher teaches a digital receiver consisting of a frame synchronization detector for recognizing a time synchronization word from the first filtered signal (see Figure 2, 210); a coarse symbol time estimator for coarsely adjusting the time synchronization of the digital signal from the frame synchronization detector (see Figure 2, 205, 410); a fine frequency estimator for finely adjusting the frequency of the signal from the coarse symbol time estimator for providing a frequency adjusted signal (see Figure 2, 240); a

mixer for combining the incoming digital signal with the frequency adjusted signal and providing a time and frequency compensated digital signal (see Figure 2, 300); a second CS filter for filtering the frequency compensated digital signal (see Figure 2, 500 where this is interpreted as equivalent); a fine symbol time estimator for determining symbol timing with greater precision (see Figure 2, 520,530); and a symbol detector for interpreting the incoming digital signal (see Figure 2, 600). Moher is silent with respect to 1st channel select filter but notes that signal is down converted prior to processing (see column 2, lines 9 – 19), and band pass filtering would be a feature of the down conversion and would have been obvious to one of ordinary skill in the art at the time of invention in order to provide a clean signal for baseband processing.

With regard to Claim 2, Moher teaches a digital receiver wherein the first CS filter has a wider bandwidth than second CS filter. Moher states that the detection filter (see figure 2, 500) reduces noise and interference (see column 6, lines 20 – 22 where this is interpreted as equivalent). It would have been obvious to one of ordinary skill in the art at the time of invention that the bandwidth of second filter would have less to accomplish further reduction of noise and interference.

With regard to Claim 3, Moher teaches a digital receiver wherein the 2nd CS filter has less bandwidth than the 1st CS filter. Moher states that the detection filter (see figure 2, 500) reduces noise and interference (see column 6, lines 20 – 22 where this is interpreted as equivalent). The selection of the filter ratios would be a design choice based on the operating parameters of the system.

With regard to claims 12 - 14, the steps claimed as method are a restatement of the functions of the apparatus of claims 1 - 3 and, therefore would have been obvious given the aforementioned rejection of claims 1 - 3.

5. Claims 4, 5, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moher et al (US-6,693,983) in view of Wannasarnmaytha et al (Two-step Kalman-filter-based AFC for direct conversion-type receiver in LEO satellite communications; Wannasarnmaytha, et al; Vehicular Technology, IEEE Transactions on , Volume: 49 , Issue: 1 , Jan. 2000 , Pages:246 – 253).

With regard to claim 4, Moher fails to teach the first CS filter has a 3 decibel (dB) bandwidth of approximately 6 Kilohertz (KHz). Wannasarnmaytha teaches the first CS filter has a bandwidth of approximately 32 (16, 8) Kilohertz (KHz)(see Table 1). Selection of the 1st filter bandwidth would be a design choice based on the operating parameters of the system and would have been obvious to one of ordinary skill in the art at the time of invention to produce an operable system.

With regard to claim 5, Moher fails to teach the 2nd CS filter has a 3 decibel (dB) bandwidth of approximately 3 Kilohertz (KHz). Moher states that the detection filter (see figure 2, 500) reduces noise and interference (see column 6, lines 20 – 22 where this is interpreted as equivalent). Selection of the 2nd filter bandwidth would be a design choice based on the operating parameters of the system and would have been obvious to one of ordinary skill in the art at the time of invention to produce an operable system.

With regard to claims 15 and 16, the steps claimed as method are a restatement of the functions of the apparatus of claims 4 and 5 and, therefore would have been obvious given the aforementioned rejection of claims 4 and 5.

Other Cited Prior Art

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Borras (US-5,715,240), Huang (US-6,058,101), Tsuda (US-5,440,267), van de Beek (US-6,628,926), Shibuya (US-6,490,010), and Hsuan (US-6,680,932) all disclose variation of time / frequency synchronization.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacob Meek whose telephone number is (571)272-3013. The examiner can normally be reached on 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571)272-2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JMM JMM

JAY K. PATEL
SUPERVISORY PATENT EXAMINER